# Small Business Lending and Regulation for Small Banks

Abhishek Srivastav*
*University of Edinburgh, U.K.*

Francesco Vallascas
*University of Durham, U.K.*

**Abstract**

Since May 2015 several U.S. Bank Holding Companies (BHCs) have been newly classified as small banks by regulators, thus benefiting from a friendlier regulatory capital environment. Using a difference-in-differences setting, we show that less regulation on small BHCs boosts small business lending of the affiliated commercial banks. We employ various tests to demonstrate that these findings are attributable to a capital channel where increases in lending are driven by the preferential capital treatment granted to the small BHC. The regulatory capital relief also has some positive effects for the local economy. Overall, the effects of the regulatory capital relief for small BHCs are consistent with its desired policy objectives.

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* Corresponding author. Email addresses: Abhishek.Srivastav@ed.ac.uk (A. Srivastav), francesco.vallascas@durham.ac.uk (F. Vallascas). Abhishek Srivastav is with the University of Edinburgh, 29 Buccleuch Place, Edinburgh, EH8 9JS, UK. Francesco Vallascas is with the University of Durham, Stockton Road, Durham DH1 3LE, UK. We thank Tomasz Piskorski (the Editor), an anonymous Associate Editor and three anonymous referees for their constructive comments. We also thank Sumit Agarwal, Jo Danbolt, Ron Giammarino, Jens Hagendorff, Kevin Keasey, Talis Putnins, Rik Sen, conference participants at the 2019 ISB Summer Finance Conference and the 2019 Community Banking conference organised by the Federal Reserve Bank of St. Louis for their helpful and constructive comments.

## 1. Introduction

In the aftermath of the global financial crisis of 2007-09, various regulatory restrictions have been imposed on the banking sector (Acharya et al. 2012; Benoit et al. 2017; Bank for International Settlements 2017; Gropp et al. 2018). Stricter regulatory standards have mainly taken the form of more stringent bank capital requirements and are aimed at mitigating systemic threats to the financial system posed by large banks. However, there are widespread concerns that the trend towards stricter regulatory regimes may be too costly for small banks, thus harming their business (Berger et al. 2017a; Federal Reserve 2017; Greenwood et al. 2017).

The concerns above have been widely explicated in policy and regulatory forums that have recognized the importance of granting a different regulatory treatment to small banks as compared to large banks in the post-crisis period.[2] This view has taken ground amongst top policy makers, ranging from the former Federal Reserve Chair Janet Yellen[3] to the FDIC Chairman Jelena McWilliams[4], and prompted the U.S. Congress to roll back Dodd-Frank regulations for small and medium-sized banks including a substantial simplification of capital rules for community banks.

The premise for designing a different regulatory capital framework for small banks was motivated by the purpose of safeguarding their key role in facilitating the access to finance for small firms that have otherwise limited funding opportunities (Behr et al. 2013; Berger et al. 2017a; Degryse and van Cayseele 2000). For instance, in 2016, U.S. banks with assets less than $1 billion held more than 25% of loans extended to small businesses although they only represented 7.4% of the total assets of the U.S. banking system (Conference of State Bank Supervisors and Federal

[2] See, for instance, Hearing on 'Regulatory relief for community banks and credit unions' before the Committee on Banking, Housing, and Urban Affairs (10 February 2015); and 'The destructive impact of regulatory burden on rural communities', Independent Community Bankers of America (9 June 2016).

[3] 'Yellen: Fed to consider treasury call for small-bank debt relief' Bloomberg BNA (12 July 2017): https://www.bna.com/yellen-fed-consider-n73014461642/.

[4] Remarks by Jelena McWiliams at the Federal Reserve Bank of Chicago Thirteenth Annual Community Bankers Symposium. "Back to Basics". Chicago, Illinois. (November 16, 2018).

Reserve 2017). Overall, via their lending to small firms, small banks contribute to the development of the local economy (Berger et al. 2017a; Hakenes et al. 2015) and to economic recovery after natural disasters (Cortés 2014). Therefore, an overwhelming burden in terms of capital regulation might constrain how small banks operate and result in significant economic and social costs.

To date, however, there are no investigations on whether a less restrictive capital regulatory framework on small banks impact their core activity in favor of small businesses. In this paper, we fill this gap in the literature by offering a novel and direct test on whether a more favorable capital regulatory setting facilitates the crucial role of small banks as funding providers in the small business market. To implement our analysis, we take advantage of a change in the U.S. regulatory context that has led to an exogenous decrease in capital regulation for some small Bank Holding Companies (BHCs). More precisely, the Small Bank Holding Company (SBHC) Policy Statement came into effect from the end of May 2015 (Federal Register 2015) and has raised the asset threshold for identifying small BHCs from $500 million to $1 billion. A key element of the small BHC status is the exemption from complex capital standards and the removal of tight leverage restrictions that is otherwise imposed on BHCs. Notably, subsidiary commercial banks of the affected small BHCs remain subjected to an unchanged regulatory capital framework.

This regulatory change is important because, as noted by FDIC Vice Chairman Thomas Hoenig and the Independent Community Bankers of America trade association (representing more than 6,500 U.S. community banks), capital regulation is one of the main areas of the overall regulatory burden for community bankers.[5] Furthermore, the large majority of these banks are controlled by a parent BHC (Federal Reserve Board 2018), which plays a key role in alleviating financial constraints of the subsidiaries (Ashcraft 2006, 2008; Gijle 2019; Holod and Peek 2010).

[5] See for instance, A Conversation about Regulatory Relief and the Community Bank: Remarks by FDIC Vice Chairman Thomas Hoenig, presented to the 24th Annual Hyman P. Minsky Conference, National Press Club, Washington, DC (April 15, 2015); and Independent Community Bankers of America (2015) `The nations voice for community banks' available at https://www.reginfo.gov/public/do/DownloadDocument?objectID=57558200.

The SBHC Policy Statement, therefore, offers two unique opportunities on the consequences of capital regulation on bank business models as compared to previous examinations (see Gropp et al. 2018). First, it allows us to assess the causal effect of a friendlier regulatory capital environment on the small business lending activities of small banks under a difference-in-differences setting. Second, it gives us the opportunity to assess if the regulatory capital benefits at the parent-level are transferable to commercial bank subsidiaries, as implied by the literature on internal capital markets in banking (Ashcraft 2008; Holod and Peek 2010).

Our analysis starts by comparing the small business lending activity of commercial banks affiliated with a "treated" BHC (that is, a BHC newly qualified as a small bank due to the adoption of the SBHC Policy Statement) to those affiliated with "untreated" BHCs over the period 2012-2018. This latter group includes commercial banks affiliated with a BHC unaffected by the regulatory change and with consolidated assets below $2 billion, but above $1 billion. A narrow asset threshold for the control group gives us a balanced composition of the treatment and control group (n= 234 banks in each group). We find strong evidence of an increase in small business lending, defined as loans with a value up to $1 million (Berger et al. 2017b; Craig and Thomson 2003), by the commercial banks in the treated group after the regulatory change as compared to the commercial banks in the control group. This finding suggests that regulatory capital relief for small BHCs benefits small business lending by their subsidiaries. Our results are economically important: after the regulatory change, the commercial banks in the treated group have increased their small business loans by approximately 5 percentage points more than the commercial banks in the control group.

One concern related to our initial test is the presence of a size differential between commercial banks in the treated and untreated group that influences our results. To mitigate this concern, we repeat our analysis by employing alternative control groups based on untreated BHCs that are smaller than treated BHCs, and already benefitted from a friendlier capital regulation before the

SBHC Policy Statement, or are identified via propensity score matching. The results remain qualitatively similar using these alternative control groups.

To the extent that the commercial banks in the treated and untreated groups may be exposed to different levels of credit demand, our findings could be partly explained by a *demand-side effect*. Although our baseline test partially accounts for the potential heterogeneity in credit demand across banks by including county controls, we are aware that it is extremely challenging to fully isolate the supply-side effect from the demand-side under our initial setting. In further tests, we attempt to provide, at minimum, evidence consistent with an interpretation of the results wherein a supply-side story plays a role.

First, we reduce the influence of confounding factors reflecting credit demand by including in the control group only commercial banks operating in contiguous counties with respect to the commercial banks in the treated group, or by adding state × year fixed effects. All tests confirm our main conclusion. Second, we conduct tests using loan-level data from the Small Business Administration (SBA) 7a as in Brown and Earle (2017). The borrowers are typically small businesses that lack access to other sources of funding and use the funds for meeting operational needs (e.g., working capital and machinery) and real estate. By estimating the model at the borrower level, we can control for the demand side by using different combinations of borrower-level industry and county fixed effects (see Degryse et al. 2019). We again find a relative increase in small loans in commercial banks in the treated group after the regulatory shock.

To provide additional support for the supply-side argument, we investigate how the capital strength of the BHCs in the treated group affects our result. Specifically, the regulatory change allows newly recognized small BHCs to be less capital constrained and raise more debt that can be invested as equity in their bank subsidiaries. Accordingly, if our result is a consequence of the regulatory change, it should be especially pronounced in commercial banks whose treated BHC was more capital constrained before the adoption of the new regulatory capital framework. In a

series of tests based on measures of regulatory capital and double leverage, we do find that our results are driven by commercial banks affiliated to BHCs that are more capital constrained. This finding holds when we use our original definition of small business loans and when we employ the SBA loan data. Furthermore, in line with our results being driven by a "capital channel" activated by the regulatory change, we document an increased ability of the parent BHCs to offer larger equity support to the affiliated commercial banks after the adoption of the new regulatory framework.

Consistent with the fundamental rationale behind the Small BHC regulatory change, we have focused our attention on small business lending.[6] A related question is whether the regulatory change has also influenced other types of lending arrangements by the commercial banks affiliated to small BHCs. This type of analysis is important to understand the overall business implications of the new regulatory change. However, we do not find an impact in terms of loans that are less likely to be related to the small business segment, such as mortgages. Instead, we find the regulatory change has a positive impact on the loan commitments of small banks, which are conventionally employed to build relationship lending activities with clients (Acharya and Mora 2015; Kashyap et al. 2002). Taken together, these findings seem to suggest that small banks exploit their competitive advantages related to their lending technology that is conventionally more likely to be directed towards smaller and opaque firms and to favor relationship lending (see, for instance, Berger and Udell 2002; Berger et al. 2017b).

Lending growth is often accompanied by a decline in lending standards (Berger and Udell 2004; Fahlenbrach et al. 2017; Koetter et al. 2019). Therefore, our findings might signal that the reduced regulation on small BHCs has also resulted in additional risk-taking in the lending market by the subsidiaries. While our post-regulatory change period might not be sufficiently long to draw

[6] See for instance, U.S. Congressional Record volume 160 (no. 67): https://www.congress.gov/congressional-record/2014/05/06/house-section/article/H3424-2

conclusive implications on this aspect, we attempt to overcome this problem by employing two spread measures that might be more effective than direct lending risk proxies in capturing the short-term effects of a shift in lending standards. Our analysis shows some indications of an increase in the risk premium charged by the commercial banks in the treated group as compared to the control group. Nevertheless, given the short length of the post-regulatory change period we examine, these results offer only preliminary indications on how the new regulatory regime might impact lending risk and more investigations are necessary to assess the net benefits of the regulatory reform.

The final part of our study examines the real impact of the small bank regulatory change. Since small banks, and their relationships with local firms, are a key driver for economic development, growth in small business lending by these banks has the potential to benefit the local economy. We examine whether this argument finds some validity in our data by running county-level regressions based on measures of economic development. We provide evidence consistent with positive real effects post-regulatory change in counties with a larger presence of commercial banks affiliated with BHCs that have been newly qualified as small entities.

Ultimately, our analysis highlights the importance for the regulatory design to balance the need to contain systemic threats posed by the joint failures of small banks with the costs that an overwhelming regulation on these banks might generate. Furthermore, we show that the regulatory relief we examine has facilitated small business lending and offer some evidence consistent with the presence of a positive real impact on the local economy, taking an important step in meeting its original objectives.

Notably, our results should not be interpreted as implying that capital regulation on small banks is not necessary. For instance, we cannot draw conclusive inferences on the risk-taking implications of the new regulatory capital framework designed for small BHCs. More importantly, commercial banks in the treated group remain subject to capital regulation and as such they are

still constrained in their risk exposures. Additionally, our empirical design does not allow us to capture the general equilibrium effects and overall level effects in the small business lending associated with a relaxed bank regulation offered to certain small banks. Instead, it offers only a comparative assessment based on two groups of banks. Similarly, it does not exclude the possibility that some of the small business loans provided by the treated banks are replacing loans that would have been made by unaffected banks or shadow banks in the absence of the regulatory change.

Our paper is related to three streams of the literature. The first stream focuses on the implications that differences in the regulatory burden across different banks generate on lending (Buchak et al. 2018; Chen et al. 2017; Cortés et al. 2020; Granja and Leuz 2019; Gropp et al. 2018), acquisition behavior (Nicoletti et al. 2018), and on financing and dividend policies (Cornett et al. 2020). In particular, Buchak et al. (2018) show that greater regulatory burden and technological change have resulted in the decline of mortgage lending by traditional banks and the rise of lending by shadow banks and FinTech banks. This substitution effect is more pronounced in areas where banks that were present locally were relatively more capital and regulatory constrained. These findings validate the view that increased regulation of the traditional banking sector following the Great Recession has generated a decline of traditional bank lending and a consequent expansion of shadow bank lending. Other studies on bank lending highlight how the growing regulatory constraints on large banks have negative implications for their general lending policy (Cortés et al. 2020) and for their lending towards small businesses (Chen et al. 2017). We extend these studies by focusing on deregulation and showing the small business market benefits from a friendlier regulatory environment for small BHCs.

The second stream focuses on the relationship between a BHC and its subsidiaries (Ashcraft 2006, 2008; Gijle 2019; Holod and Peek 2010). These studies highlight that a BHC contributes to alleviating financial constraints of their subsidiaries and document that the loan growth of a subsidiary is more linked to the cash flow and capital of the parent holding company than to its

own financial health. We show that a dual regulatory system consisting of a reduced regulation at the parent level, but an unchanged regulatory framework at the subsidiary level, benefits the lending policies of the subsidiaries.

The third stream of literature focuses on the importance of small banks for the economy (Behr et al. 2013; Berger et al. 2017a; Cortés 2014; Degryse and van Cayseele 2000). This literature concludes that small banks can be more effective than large banks in alleviating the financial constraints of small firms via relationship banking and reliance on soft information. A key implication from these studies is that the consolidation process in the banking industry and the disappearance of small banks impose social costs (Berger et al. 2017a). Our analysis implies that imposing excess regulatory constraints on small BHCs can be detrimental to the society via its negative implications on small business lending and the local economy.

The rest of the paper proceeds as follows. Section 2 explains the institutional setting related to the regulatory change on the small BHC status. Section 3 describes the data, the variables and the difference-in-differences approach employed in the empirical tests. Section 4 focuses on the empirical results whereas section 5 offers conclusions.

## 2. Institutional Background

Bank Holding Companies (BHCs) are a key component of the US banking system. At the end of 2018, there were a total of 4,300 BHCs in operation that controlled almost 4,000 insured commercial banks and about 94% of all insured commercial bank assets (Federal Reserve Board, 2018).[7] The regulatory treatment of BHCs depends on their size with "small BHCs" benefitting from a friendlier regulation. A tailored regulatory approach recognizes the importance of small

[7] The majority of US banks adopt the HC organizational structure because the parent HC can act as a source of capital and financial strength for subsidiary commercial banks, such as by infusing equity and buying problem assets of the subsidiary. This organizational form also allows banks greater flexibility to engage in business expansion and diversification since the HC can use debt to finance acquisitions and buy stock in other financial institutions.

banks for the economy and offers advantages to small BHCs in terms of financial flexibility. In contrast, when regulatory pressures on small banks increase, as in the post 2007 crisis period (e.g., the 2010 Dodd Frank Act), their lending tends to be constrained (Bordo and Duca 2018).

Against this backdrop, the Small Bank Holding Company (SBHC) Policy Statement, signed into Public Law 113-250 in December 2014 and came into effect from the end of May 2015, has changed the regulatory definition of small BHC. The regulatory change raises the asset threshold for qualifying a BHC as a small entity from $500 million (threshold valid from 2006) to $1 billion. The small BHC status retracts various capital requirements that had resulted in over-burdening small BHCs and leads to a less restrictive capital regulation at the parent holding company-level while maintaining unchanged capital regulation for the subsidiaries.[8] In particular, the newly recognized small BHC becomes exempt from risk-based and leverage capital rules under Basel III. These exemptions allow small BHCs to increase their debt carrying capacity.[9] BHCs above the asset threshold of $1 billion are instead constrained in terms of the amount of debt that they can hold and any debt issued can only be qualified as Tier-2 capital under restrictive conditions, such as having a minimum maturity of five years (Federal Reserve Bank of Richmond 2016).

BHCs that are regulated as small entities under the SBHC Policy Statement can use their increased debt capacity to inject Tier-1 capital into the subsidiary commercial banks and finance the credit expansion of these subsidiaries. This expectation is in line with the widespread view that a BHC contributes to alleviating financial constraints of its commercial bank(s) and with the

[8] Small bank holding companies are also required to meet qualitative conditions that stipulate such qualifying banks to not engage in significant non-banking activities through subsidiaries, and in significant off-balance sheet activities such as securitization, and not have substantial outstanding equity or debt that is registered with the SEC. More generally, maintaining the focus of capital regulation on the subsidiaries is motivated by the idea that most of the risks for the banking group arise from the business lines of the subsidiaries and not from the parent company.

[9] A related benefit is that eligible small BHCs can use debt to finance up to 75% of acquisitions, although this is subject to various regulatory requirements such as dividend restrictions and systematic debt repayment schedule (Federal Register 2015).

empirical evidence indicating that the loan growth of a subsidiary is more linked to the cash flow and capital of the parent holding company than to its own financial health (Ashcraft 2006, 2008; Gijle 2019; Holod and Peek 2010).[10]

Various anecdotal examples further lend support to the potential impact of SBHC Policy Statement on the lending policies of the subsidiaries of the affected BHCs. For instance, the Independent Community Bankers of America and the American Bankers Association stated that the SBHC Act should substantially increase the opportunities for the affected BHCs to provide capital to their subsidiaries. This capital provision should then contribute to lending growth.[11] All in all, through the changes in capital regulation, the SBHC Policy Statement's aim is to spur local economic growth by supporting small businesses.

In addition to changing the design of capital regulation, the SBHC Policy Statement introduces other simplifications in the regulation of newly qualified small BHCs. However, these further changes are less likely to directly influence the financial position of the subsidiaries as they take the form of a reduction in the quantity of regulatory reporting for the parent BHC. The affected BHCs benefit from a decrease in the reporting burden in terms of the number of items to be reported in regulatory call reports.[12]

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[10] Notably, consistent with the expectations arising from the new SBHC Policy Statement, and with the previous argument, the debt issuance by BHCs under $1billion threshold has increased by more than 300% from $104 million in 2014 to $317 million in 2015 (S&P Market Intelligence Report 2016).

[11] See for instance, `The nation's voice for community banks', Independent Community Bankers of America (2015) available at https://www.reginfo.gov/public/do/DownloadDocument?objectID=57558200; and 'Letters to Congress/Regulators' American Bankers Association (2014) available at https://www.aba.com/Advocacy/LetterstoCongress/Documents/HouseMemoreHR3329andHR2672050514.pdf

[12] Prior to the Act, all BHCs above $500 million were required to file quarterly FR-Y9C regulatory reports with over 2600 items and a length of 60. These banks had to also separately file a parent only FR-Y9 LP regulatory report (consisting of 186 items over 9 pages) filed semi-annually. However, after the Act, all affected BHCs have to file only semi-annual parent-only financial statements (FR-Y9 SP). Other related advantages of the Act include a longer period

The SBHC Policy Statement of December 2014 is not the first modification of the definition of Small BHC that has occurred in the U.S. banking industry. While the size threshold from 1986 to 2005 was set to $150 million in total consolidated assets, the Fed increased this threshold to $500 million in March 2006. Bisetti (2020) focuses on the influence of this regulatory change on the reporting and supervisory requirements of small BHCs and shows negative value effects for the shareholders of treated publicly-listed BHCs produced by a reduced regulatory monitoring. Differently from Bisetti (2020), we focus on the lending consequences for the affiliated commercial banks due to changes in capital regulation for the parent BHCs and not on the value consequences for the shareholders of these parent companies. As a result, we do not restrict our sample selection to listed BHCs.

## 3. Sample and Data

We select our sample by identifying all U.S. commercial banks that are affiliated to a parent BHC over the period 2012-2018. We next gather BHC accounting data from the Federal Reserve Regulatory dataset and commercial bank accounting data from the Federal Reserve's (FFIEC 031 and 041 filings) Report of Condition and Income. County-level macroeconomic data is extracted from the Bureau of Labor Statistics and Bureau of Economic Analysis.

The implementation of our empirical analysis requires the categorization of affiliated commercial banks into two groups (treated and untreated) with respect to the impact of the regulatory change on the parent BHC. To classify BHC-affiliated commercial banks into the treated group, we require two conditions to be jointly satisfied. First, the parent BHC should have switched from FR Y9C (i.e., quarterly) reporting to FR Y9-SP (semi-annual) reporting, as permitted by the small BHC status. Second, the parent BHC falling in the sub-group of *new* Y-9

between on-site examinations since the newly recognized small BHCs now fall out of the Fed's peer group analyses. This change, however, is only applicable to well-capitalized BHCs and only from January 2017.

SP filers has consolidated assets larger than $500 million as of Q4-2014 (i.e., the last fiscal year end prior the SBHC came into effect); namely, above the original assets threshold for being recognized as a small BHC. By applying these criteria at the BHC level, we identify 234 commercial banks to include in the treated group.

All commercial banks controlled by a BHC that does not qualify as a small entity under the December 2014 SBHC Act are candidates for the control group. However, to ensure that large differences in size between the banks in the two groups do not drive the results, we restrict the control group to commercial banks affiliated to a BHC with consolidated assets above $1 billion but below $2 billion. We identify 234 commercial banks affiliated to a BHC that meets this criterion. Section 4 documents that our results hold when we use two alternative control groups.

### 3.1. Empirical Setup

We test the impact of the SBHC regulatory change on the small business lending policy of the commercial banks affiliated to treated BHCs by employing a difference-in-differences design as shown in equation (1):

$$\text{Small Business Loans}_{i,j,c,t} = \alpha + \beta\ \text{Small Bank}_{\mathbf{i,j}} \times \text{Post-Shock}_{\mathbf{t}} + \gamma\ \mathbf{BC}_{i,j,t-1} + \delta\ \mathbf{CC}_{c,t-1} + \mathbf{Time_t} + \mathbf{BHC_j} + \mathbf{County_c} + \varepsilon_{i,j,c,t} \quad (1)$$

The dependent variable is the log of the dollar amount of loans with a value less than $1 million in a commercial bank *i,* affiliated to BHC *j* at time t that is located in county *c*. We estimate the model with standard errors clustered at the BHC level to account for potential within-banking group correlation in the lending policy of the subsidiaries. Since data on small business loans for each affiliated commercial bank is only reported at the end of each June, our regressions are effectively run at yearly frequency and employ yearly small lending data from 2013Q2 to 2018Q2. The relatively short estimation window should reduce potential concerns related to modelling

serially correlated outcomes under a difference-in-differences setting (see Bertrand et al. 2004). We further account for this aspect in section 4.1.1.

Our measure of small business loans is consistent with Berger et al. (2017b) and the CSBS-Federal Reserve 2017 National Survey. As highlighted by Berger et al. (2017b), this definition of small business lending, based on the loan amount and not borrower size, is only a proxy of the small business activity of a bank. Nevertheless, in our sample, this proxy should be reliable as we only consider small banks that are likely to originate relationship-driven loans catering to small businesses operating in the local economy.[13] Along these lines, the CSBS-Federal Reserve 2017 National Survey shows that 98% of the small community banks surveyed were involved in making small business loans.

The coefficient of interest is (β) *Small Bank* × *Post-Shock*, where *Small Bank* is a dummy identifying commercial banks affiliated to a BHC that acquires the small banking status with the implementation of the regulatory change and *Post-Shock* is a dummy that equals one from the period after the regulatory change came into effect and zero otherwise. A positive and significant β indicates a larger increase in small business loans by the subsidiaries of newly classified small BHCs after the regulatory shock, relative to the control group. Given the log of the dependent variable, the coefficient of *Small Bank* × *Post-Shock* indicates the difference in the average small business lending growth rate in the two groups of banks from the pre to the post shock period.

[Insert Table 1 here]

**BC** is a vector of commercial bank controls identified in previous studies as potential determinants of a bank's lending policy (DeYoung et al. 2015). The vector includes *Bank Size* (the log of total assets), *Equity Capital* (total equity divided by total assets), *Deposits* (total deposits to

[13] The precise definition of small business loans remains conflicted. According to a recent 2017 CSBS-Federal Reserve National Survey of banks, nearly 31% of banks classified small loans on the basis of loan size and 27% classified them according to borrower revenue. Interestingly, 38% of banks classified all commercial loans as small business loans.

assets), *Profitability* (operating income divided by total assets), *Earnings Volatility* (the standard deviation of profitability over the previous eight quarters), and *Loan Quality* (loan loss provisions scaled by total assets). To reduce endogeneity concerns, we measure bank controls at the end of the fiscal year preceding the information on small business lending.

The vector **CC** includes county controls and refers to the county wherein a commercial bank is located. By focusing on the location of the commercial bank, and not on the location of the parent BHC, we intend to account for local economic dynamics that might affect loan demand where the commercial bank is located. The vector of county controls includes the percentage change in establishments, a weekly measure of average wage and unemployment rate. While it is intrinsically difficult to disentangle the supply side from the demand side in any analysis on bank lending, in section 4.1.2, we present additional empirical strategies to control for demand factors. Finally, we include in the model, year, BHC and county fixed effects (with dummies taking a value of one in the county where the affiliated commercial bank is located). The standalone coefficients of *Small Bank* and *Post-Shock* are absorbed by the inclusion of these fixed effects.

Panel A of Table 1 reports the descriptive statistics for the variables employed in the model. The average commercial bank in our sample has an equity ratio of 10.6% and is typically funded with 82.9% of deposits.

### 3.2. Comparing Untreated and Treated Banks and Assessing the Parallel Trend Assumption

One of the key assumptions of our empirical strategy is that the untreated group represents an adequate counterfactual. In this section, we present several stylized facts to support the validity of this assumption. We start by highlighting whether commercial banks in the untreated and treated groups are sufficiently similar in their characteristics before the regulatory change. The first four columns of Panel B of Table 1 show summary statistics of bank controls for the control group and the treated group in the last fiscal year end (2014Q4) before the regulatory change came

into effect, while column (5) reports the normalized difference in bank characteristics between the two groups of banks (Brown and Earle 2017). The difference is defined as follows:

$$NDIFF = \frac{\bar{X}_i - \bar{X}_j}{\sqrt{S_i^2 + S_j^2}} \quad (2)$$

where $\bar{X}_i$ ($S_i^2$) in the mean (variance) of a variable for one of the untreated groups and $\bar{X}_j$ ($S_j^2$) is the mean (variance) of the same variable for the treated group. We note that the differences between the control group and the treated group are below the threshold value of 0.25 identified by Imbens and Wooldridge (2009) to ensure that the two groups are sufficiently homogenous. The only exception is the normalized difference in size. However, in spite of the size restrictions we impose on the control group, the difference in the average size between commercial banks in the two groups is inevitable given the nature of the regulatory change on the small BHC status. To account for this difference in size, therefore, we consistently control for bank size in the regressions and, more importantly, we present additional tests using alternative control groups that we discuss in section 4.

An adequate counterfactual in a difference-in-differences setting also requires that the banks in the treated and control groups would have shown similar trends in their small lending policy in the absence of the regulatory shock. The validity of this requirement cannot be directly tested as we do not know the small business lending dynamics of the treated group in the absence of the shock. However, the conventional approach in the literature is to examine whether the two groups of banks follow similar trends in their small business lending at least in the period preceding the regulatory change. In such a case, we can plausibly conclude that the assumption of similar trends between the two groups without the regulatory change is not invalid.

We begin by plotting in Figure 1 the trend in our dependent variable for the two groups of banks after controlling for bank and county controls. We estimate these trends only using the pre-regulatory change period (from 2011Q2 to 2014Q2) to avoid that our estimates are influenced by

the effects of the new regulation on the lending dynamics of the two groups of banks. The Figure shows similar trends in the two groups before the regulatory change over the pre-shock window.

[Insert Figure 1 here]

Finally, in the Online Appendix (Table A1), we test for the presence of any *pre-shock differential in trends* in our dependent variable as in Jiang et al. (2016) and Chen et al. (2018). The dependent variable in our regression specification is the log of the dollar value of small business loans and we include a deregulation dummy interacted with yearly dummies ($D_{it}^{q}$) for the $q$ lags/leads of the period around the passage of the Small Bank Holding Company Policy Statement. The model includes BHC, county and time fixed effects. We estimate the model using small lending data from 2011Q2 to 2018Q2. We find there is no any pre-shock trend differential between the control and treated groups.

In summary, this section corroborates the validity of our setting to evaluate how the regulatory change in the definition of small BHCs influences small business lending by the affiliated commercial banks.

## 4. Empirical Results

### 4.1. The Impact of the Regulatory Change on Small Business Lending

Table 2 reports the results on whether the SBHC Act affects small business lending policies of commercial banks affiliated to newly qualified small BHCs relative to the control group. The first column shows the regression results where we use only commercial bank size and various fixed effects as explanatory variables. In the second column, we include county controls and in the final column we extend the specification to account for the remaining bank controls that we have discussed in section 3.

[Insert Table 2 here]

We consistently find an increase in small business lending by commercial banks in the treated group post-regulatory change relative to the control group. In particular, in column (3), we find that the estimated coefficient indicates an increase in small business lending after the implementation of the regulatory change that is 5 percentage points larger in the treated group as compared to the control group. The inclusion of additional bank controls does not significantly affect the magnitude of the coefficient of *Small Bank* × *Post-Shock*, although some of these controls enter with a significant coefficient in the last column of Table 2. Specifically, we observe that small business lending increases when commercial banks are relatively larger and more profitable. Furthermore, we find a larger increase in small business lending in banks located in counties characterized by a larger growth in the number of establishments that should plausibly reflect an influence by credit demand.

[Insert Table 2 here]

In Tables A2-A3 of the Online Appendix, we present various tests to assess the robustness of our findings. We first repeat our analysis with a relative measure of small business loans as the dependent variable (namely, the ratio between the total amount of small business loans and bank total assets). Next, we include various additional county-level characteristics, such as demographics and growth in county-level macro variables that may affect credit policies of local banks following Chen et al. (2017). Finally, we control for additional bank characteristics (deposit market structure and sensitivity to interest rate risk) that could be associated with a bank's lending policies following Acharya et al. (2018) and Berger et al. (2017b). Our results still hold under these settings.[14]

[14] In unreported tests, we use a weighted measure of local county conditions by taking into account the fact that banks have branches that are spread across various counties and therefore are exposed to different local conditions. To account for this, we compute a weighted-average measure of the county controls, shown in equation (1), using the % of deposits in each county as the weights. Our results remain very similar.

Overall, we find consistent evidence in favor of an increase in small business lending by commercial banks that have benefited from a shift to the small bank status by their parent BHCs, as compared to commercial banks affiliated with untreated BHCs.

*4.1.1. Alternative Specifications and Falsification Tests*

We next conduct various additional robustness tests by modifying our empirical strategy. First, Bertrand et al. (2004) highlight that potentially serially correlated outcomes lead to over-reject the null hypothesis of no effect in a difference-in-differences framework. Although we use a short estimation period to mitigate this concern, a further suggested remedy is to collapse the estimation period to only one period before and one period after the shock. In the first two columns of Panel A of Table 3, we repeat the analysis using this alternative empirical setting. For brevity, we report only the key coefficient for *Small Bank* × *Post-Shock* and find that our results remain largely unchanged.

Next, we repeat our baseline analysis using a second control group composed of commercial banks affiliated to a BHC that has consolidated assets less than $500 million but more than $400 million. We identify 200 affiliated commercial banks that satisfy these requirements. The use of this alternative control group mitigates concerns that our initial results are driven by size differences between treated and control banks. The results, reported in columns (3)-(4) of Table 3, are in line with the findings shown in Table 2, although the magnitude of the coefficient of *Small Bank* × *Post-Shock* appears relatively smaller than what we have initially observed. This finding is not entirely surprising as the smaller banks included in this second control group might have more scope for expansion after the regulatory change without losing the broader regulatory benefits associated with the small bank status of their parent BHC. Finally, the last two columns of Table

3 report the estimation results based on a control group that we identify using propensity-score matching.[15] We still find that our key result holds when we use this control group.

[Insert Table 3 here]

Next, Panel B of Table 3 offers support for a causal role of the regulatory change on our findings by showing several falsification tests that are based on artificial settings characterized by pseudo regulatory shocks. These pseudo shocks should not lead to any change in the lending policy in the (falsely) defined group of "treated banks" if our initial results are the consequence of the SBHC Act. We initially assume that the regulatory change imposes an asset threshold of $5 billion and not of $1 billion. Consequently, the new treated group includes all the commercial banks affiliated with BHCs with an asset value between $1 billion and $5 billion, whereas the new control group includes all commercial banks owned by BHCs with assets above $5 billion but below $10 billion. The results, reported in the first two columns of Panel B, do not show any significant change in the small lending policy of the "falsely treated" group after the pseudo regulatory change.

In columns (3) and (4) we assume that the $1 billion threshold for small BHCs came into effect in 2013Q2 (two years earlier than the actual date) with the full sample period ending in 2015. We then repeat our initial tests for our original treated and untreated groups using this different time framework. We do not find any difference in the small lending policy of the two groups of banks. Finally, we rely on the Senate Bill (HR 3791) that was proposed in October 2015 suggesting that the small BHC asset threshold should be increased from $1 billion to $5 billion. This proposal

[15] For identifying matched control banks, we run a probit model where our dependent variable is a dummy that equals one if the bank is in the treated group and zero otherwise. We perform the matching exercise on our treatment sample and control sample composed of BHC-affiliated commercial banks used in the baseline tests shown in section 4.1. That is, our treatment sample consists of all commercial banks affiliated to small BHCs that become eligible under the Small BHC Policy Statement, and the control sample comprises of all commercial banks affiliated to untreated BHCs that are less than $2 billion but more than $1 billion. The control variables utilised for the matching exercise are the vector of commercial bank controls (equity capital, deposit base, profitability, earnings volatility, and loan quality). Each treated bank is matched to a control bank with replacement (1:1). The final sample consists of 234 banks in the treated group and 129 in the control group.

represents a potential (never implemented), and not an actual, regulatory change. We use this regulatory proposal and repeat our main test by assuming that the asset threshold for regulatory relief increases to $5 billion from October 2015. As a result, the post regulatory shock dummy takes the value of one after the date of the bill. Furthermore, the treated group consists of all commercial banks affiliated with a BHC with assets between $1 billion and $5 billion while the control group includes commercial banks affiliated with a BHC with asset values larger than $5 billion but below $10 billion. As compared to the actual test, this falsification test results in a change of both a) the time period and b) the asset threshold. We still do not find any difference in small business lending between the newly "treated" and "untreated" banks, as shown in columns (5) and (6) of Table 3 (Panel B).

*4.1.2.Demand Effects*

A key challenge when assessing the impact of any regulatory change on bank lending policies is to disentangle the supply-side effect from the demand-side effect. Although we include county fixed effects and other county variables to plausibly capture differences in credit demand across banks, it is still likely that our analysis is not completely ruling out the influence of demand factors on the results. This section documents further tests to control for the demand side.

[Insert Table 4 here]

First, in Table 4 we attempt to restrict variations in the credit demand across the sampled commercial banks. We begin by restricting the sample to only control banks operating in the same or neighboring counties as the treated banks. This choice should ensure that the two groups of banks are more likely to be exposed to a similar credit demand. We next include State × Year fixed

effects in order to account for heterogeneity in credit demand across different geographic locations.[16] All these tests continue to support our main findings.

Second, and more importantly, we follow Chen et al. (2017) and employ data on small loan originations at the borrower level to control for the demand side. Chen et al. (2017) rely on Community Reinvestment Act (CRA) data that contains the dollar value of loans originated for small businesses. Since the treated banks in our sample are not required to report such data, we follow Brown and Earle (2017) and use loan-level origination data from the Small Business Administration (SBA) 7a loans under its Preferred Lender Program (PLP) and the SBA Express program. These loans are granted to meet the external financing needs of start-ups and small businesses and are partially guaranteed (from 50% to 85%) by the SBA. The borrowers are typically small businesses and lack access to other sources of funding and largely use the funds for meeting operational needs (working capital and machinery) and real estate. The advantage of using this data is that our regressions reflect new loans originated by banks and we have detailed borrower-level information that can be used to construct controls for the demand effect.

[Insert Table 5 here]

More formally, we estimate the following model at the borrower level over the same time period as our main tests (Section 3.1) where the dependent variable is the log of the dollar value of new loans granted by a small commercial bank *i,* affiliated to a BHC *j,* to a borrower *z*:

$$\text{SBA Loans}_{i,j,z,c,t} = \alpha + \beta\ \text{Small Bank}_{\mathbf{i,j}} \times \text{Post-Shock}_{\mathbf{t}} + \gamma\ \mathbf{BC}_{i,j,t-1} + \delta\ \mathbf{CC}_{c,t-1} + \theta \mathbf{LC}_{i,j,z,t} + \mathbf{Time_t} + \mathbf{BHC_j} + \mathbf{Borrower\ Industry_z}\ \text{X}\ \mathbf{County_c} + \varepsilon_{i,j,z,c,t} \quad (3)$$

[16] An alternative could be the inclusion of county × year fixed effects. However, the majority of counties in our sample only have one commercial bank, and this makes any inference based on this setting questionable. Nevertheless, we account for county-specific variation using contiguous counties × year fixed effects that accounts for time-varying demand characteristics across control banks that are located in the same or neighbouring counties. Our results, shown in the Online Appendix (Table A3), remain similar

We use a similar set of controls as in our baseline model with the addition of a vector of loan characteristics (**LC**). In particular, we control for *% Guaranteed* (fraction of gross loans guaranteed by the SBA), *Maturity* (maturity of the loan in years), and *Interest* (interest rate on loan origination in excess of maturity-matched T-bill rate). Panel A of Table 5 reports summary statistics for the dependent variable and the additional controls employed in this analysis. Multiple loan applications for the same borrower-bank-year observation are aggregated and cancelled loans are excluded from the sample. As in Degryse et al. (2019), the new setting allows us to improve our control of the demand effects by using borrower industry × county fixed effects (borrower industry × state fixed effects). Essentially, we can model the origination of new small loans to a borrower operating in an industry in a given county (state).[17] In additional tests we also account for borrower industry × State × borrower size tercile fixed effects as an alternative setting to control for the dynamics of loan demand. We define borrower-industry fixed effects at the two-digit NAICS level.

We report the results in Panel B of Table 5 with the different combinations of fixed effects mentioned above. Across all specifications, we find that commercial banks affiliated with BHCs that gain the small BHC status originate a larger amount of small loans as compared to the small banks in the control group after the regulatory change. In particular, using the specification in column (4), we find that the regulatory change results in an increase in new small loans by 17%. With the average $ loan originated in the pre-shock quarter equal to $454,591, the regulatory change results in increasing the loan amount by more than $77,280 for each borrower.

In spite of the intrinsic difficulty to fully rule out a role for demand factors, the results discussed in this section are consistent with our initial findings and highlight that our key conclusions do not depend on how we control for these factors. Therefore, the analyses presented

[17] Data on SBA 7A loans is available for a smaller subsample of 107 treated banks and 115 control banks. Schüwer et al. (2018) also note that the data on SBA 7A loans restricts the analysis to a smaller subsample of banks (their sample decreases from 1,253 to 337 banks).

in this section seem at least to exclude that our results are *entirely* due to omitted demand factors. We provide additional evidence in favor on this argument in the next section.

### 4.2. Does the Capital Relief for the parent BHC Drive Our Results?

In this section, we present three tests to show that the expansion in small business lending by the commercial banks in the treated group is driven by a "capital channel" originating from the regulatory capital relief received by the parent BHC. First, we examine how our results vary when we differentiate commercial banks in the treated group on the basis of the regulatory capital strength of their parent BHC at the last fiscal year-end before the regulatory change (i.e., 2014Q4). To this end, we extend our baseline model and estimate the following specification similar to Irani and Oesch (2013):

$$\text{Small Business Loans}_{i,j,c,t} = \alpha + \beta_1 [\text{Small Banks\_High\_Regulatory Capital}]_{i,j} \times \text{Post-Shock}_t +$$

$$\beta_2 [\text{Small Banks\_Low\_Regulatory Capital}]_{i,j} \times \text{Post-Shock}_t + \gamma \mathbf{BC}_{i,t-1} + \delta \mathbf{CC}_{c,t-1} +$$

$$\mathbf{Time_t + BHC_j + County_c} + \varepsilon_{i,j,c,t} \quad (4)$$

where we classify commercial banks as affiliated to a BHC with higher (lower) regulatory capital if the Tier-1 regulatory capital ratio is above (below) the sample median. We also replicate the same approach using equation (3) based on the SBA data. If our results are related to capital benefits produced by the regulatory relief, they should materialize especially in commercial banks affiliated to BHCs that were more (regulatory) capital constrained prior to the shock.

[Insert Table 6 here]

Second, we re-estimate similar specifications where we classify BHCs on the basis of their double leverage that we calculate as the total equity investment by the parent holding company in the subsidiaries scaled by the parent company's equity capital (see Krainer and Lopez 2009; Office of the Comptroller of the Currency 2009). This variable indicates the extent to which a BHC has exploited its leverage to acquire shares of the subsidiaries and reflects the amount of BHC's equity

capital buffer that can be used to compensate against damage to the equity capital of the subsidiaries (Krainer and Lopez 2009).

We report the results of the regulatory capital tests and the double leverage tests in Panels A and B of Table 6, respectively. The findings are consistent with the capital relief received by small BHCs driving our results. Specifically, we consistently find that our results are driven by commercial banks in the treated group affiliated to small BHCs that were plausibly more capital constrained prior to the regulatory change. The effects of the capital relief appear to be economically important for this group of banks. For instance, if we consider the estimates in column (1) of Panel A we find an increase in the growth rate of the small loans for commercial banks affiliated to a more capital constrained small BHC that is more than 7 percentage points larger as compared to the control group from the pre to the post shock period.

Finally, in Panel C of Table 6, we present tests aimed at assessing whether the SBHC Act has indeed increased the ability of the parent BHCs to offer equity support to the affiliated commercial banks. We construct a measure of equity capital infusion that the subsidiary commercial bank receives from its holding company and test whether this measure increases for commercial banks owned by treated BHCs post-regulatory change. In these regressions, we include the same set of controls that we have employed in our lending tests.

We measure the equity infusion from a BHC to an affiliated commercial bank via the sum of net change in capital stock and other transactions with the holding company divided by the beginning-of-year equity, following Ashcraft (2008) and Nicoletti et al. (2018). We multiply this value by the percentage of equity held by the holding company in the subsidiary. The results, reported in the first two columns, support the view that the regulatory change has favored the flow of equity from the parent bank to the subsidiary.[18]

[18] Debt infusion can be another potential source of funding whereby the parent BHC engages in internal lending with its subsidiary commercial banks. However, in our sample, we find that only 46 out of 234 treated commercial banks

Taken together, the results of this section are consistent with an interpretation of our results based on the effects of the SBHC Act and with these effects materializing via a "capital channel" that benefits the subsidiaries of newly qualified small BHCs.[19]

### 4.3. The Influence of the Regulatory Change on Other Credit Arrangements and Risk

#### *4.3.1. Other Types of Loans and Loan Commitments*

The increase in small business lending does not imply a direct impact of the regulatory change on other types of lending by the subsidiaries of the treated BHCs. For instance, the commercial banks and their parent BHCs might have focused their expansion only on small business loans if this expansion is facilitated by the competitive advantages normally associated with the peculiarities of their lending technology. This may be consistent with the argument that smaller banks are conventionally more oriented towards building long-term relationships with smaller businesses as compared to larger competing banks (see, for instance, Berger and Udell 2002; Berger et al. 2017b).

[Insert Table 7 here]

To understand whether, and how, the SBHC Act has influenced other typologies of lending by treated banks, we repeat our baseline analysis separately for: i) Mortgage Loans; ii) Commercial and Industrial Loans (C&I); iii) Other Loans (defined as the remaining loans in the portfolio). Specifically, we re-estimate equation (1) using the log of the dollar value of each type of loan category as a dependent variable. The results, reported from column (1) to column (6) of Table 7,

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experience such sort of debt infusion. The average value of this debt (scaled by HC assets) is 0.2% (raw amount: $1.9 million). This result is not surprising because commercial banks in our sample remain subject to capital regulation. Therefore, BHCs can boost the regulatory capital ratio of these banks only by opting for equity investments into the subsidiary commercial banks.

[19] Another key funding source that small banks can use to expand loans is related to deposits. In particular, it might be suggested that if the regulatory changes favor lending growth it could also push commercial banks affiliated to treated BHCs to increase the remuneration to depositors to fuel this growth (with a related increase in deposits). In unreported tests based on branch level data, however, we do not find consistent and strong support for this conjecture.

do not show any effect of the regulatory change on other loans: in all specifications the coefficient of *Small Banks* × *Post-Shock* is not significant at conventional levels. Furthermore, in additional tests, reported in Table A4 of the Online Appendix, we also show that the regulatory change does not produce any significant effect on the difference between total loans and loans with a value less than $1 million.

Our findings suggest that commercial banks in the treated group are expanding where they should have potentially stronger competitive advantages as compared to larger banks in building credit relationships. In this respect, one of the credit arrangements often utilized to build longer-term relationships with borrowers, and enhance relationship lending, is a loan commitment (Acharya and Mora 2015; Kashyap et al. 2002). Such arrangements can be substantial for the banking industry (Strahan 2012) and are a source of meeting short-term liquidity needs of small firms (Sufi 2007).

Therefore, if treated banks are exploiting their competitive advantages in terms of lending technology, we should expect an increase in loan commitments in response to the regulatory change as an attempt to build relationship lending activities with their clients. We use two measures of loan commitments: i) total commitments consisting of unused loan commitments and letters of credit (financial, performance, and commercial); ii) unused loan commitments based on Acharya and Mora (2015) and Cornett et al. (2011). We employ the log of the dollar value of the two measures of loan commitments as dependent variables and estimate regression models using a similar empirical approach as in equation (3). The results in the last four columns of Table 7 show that commercial banks in the treated group increase total and unused loan commitments after the regulatory change as compared to banks in the control group. This finding is consistent with an attempt of the small commercial banks in the treated group of exploiting the strengths conventionally associated with their lending technology.

*4.3.2.Does the Regulatory Change Increase Lending to Riskier Borrowers?*

A friendlier regulatory environment for small BHCs might also have negative implications in terms of risk-taking in the credit market. It has been shown that the propensity to expand bank lending, as what we have observed in the group of commercial banks affiliated to treated BHCs, is often accompanied by a decline in lending standards (Berger and Udell 2004; Fahlenbrach et al. 2017; Koetter et al. 2019). A reduced lending quality may then raise concerns in terms of bank stability amongst regulators and policy makers.

[Insert Table 8 here]

However, understanding the risk-taking effects of the regulatory change with our data is challenging. This is because the post-regulatory change period in our sample might not be sufficiently long to draw conclusive implications in terms of the effects of the regulatory change on a bank's lending standards. For instance, measures of non-performing loans might not be effective in capturing the immediate lending risk implications since they are more likely to reflect past lending choices implemented prior to the new regulatory regime. Furthermore, if the increase in risk-taking by the commercial banks in the treated group after the regulatory change simply takes the form of more loans provided to borrowers with a relatively higher probability of default, as compared to the pre-shock period, we should not necessarily observe that non-performing loans increase over our time period (and they might not even increase over a longer time period).

We attempt to overcome the above problems by employing two spread measures that might be more effective in capturing the short-term effects of a shift in lending standards by treated commercial banks. The first is the risk premium applied to new SBA originated loans that is defined as the log of the interest rate charged on loans in excess of maturity-matched T-bill rate. The second is obtained from bank accounting data as in Covas et al. (2015) and Claessens et al. (2018). We employ the log of the difference between the net interest income scale by total earning assets and the five-year T-bill rate. We then estimate similar models as those reported in Table 2 using these spread measures as dependent variables.

Our findings, shown in Table 9, document some evidence of an increase in the risk premium charged by the commercial banks in the treated group in the post shock period relative to the control group. This latter result points towards the possibility that the supply of small business loans by the commercial banks in the treated group is (also) directed towards relatively more "marginal" borrowers after the regulatory change.

Ultimately, the findings discussed in this section offer some preliminary indications on the potential consequences of the regulatory change in terms of more aggressive lending standards by treated commercial banks However, longer-term analyses are necessary to fully assess the credit risk-taking consequences of the revised capital framework for small BHCs. Furthermore, the commercial banks in our treated group still remain subjected to capital requirements. As a result, they remain constrained in terms of risk-taking, thus potentially reducing the incentives to implement excessively risky lending strategies after the regulatory change affecting the parent company.

*4.3.3.Does the Regulatory Change Increase Risk at the BHC level?*

Another potential mechanism to test the risk-taking implications of the regulatory change is to explore if treated small BHCs are increasing their reliance on debt at the parent level, which is then transferred to the subsidiary commercial banks as equity. We test for this channel by conducting analyses at the BHC-level where our treatment sample is composed of 215 BHCs and control sample consists of 199 BHCs. Our analysis focuses on assessing if there is an aggregate shift in the amount of debt held by the HC after the shock. The dependent variable is the log of debt issued in the form of short-term and long-term borrowings using data on FR Y9LP and FR Y9SP reports that contain data at the parent company level (unconsolidated). We run this model with BHC and year fixed effects and various bank controls (*Size* defined as log of assets, *Profitability* defined as total operating income to assets, and *Equity Capital* calculated as HC equity to assets). As shown in Table A5 of the Online Appendix, we find that small BHCs in our treated group

experience a growth in the aggregate level of borrowing relative to the control group after the regulatory change. This finding is consistent with a recent announcement by the Federal Reserve Bank of Richmond (2016) and S&P Market Intelligence (2016) that highlighted increase in debt issuance by small BHCs.

It is worth noting, however, that the result above is not surprising and it is in line with the expectations of regulators. In fact, raising more debt at the parent level is supposed to be beneficial for expansion and may not be detrimental for the stability of the entire banking group. This is because the emphasis of the regulatory treatment for Small BHCs at the subsidiary level implies that most of the business of the banking group, and the related risks, is generated by the subsidiaries (and not by the holding company).

### 4.4. Does the Regulatory Change Produce Positive Real Effects for the Local Economy?

The small business lending activity of small banks tends to result in positive real effects for the local economy (Behr et al. 2013; Berger et al. 2017a; Cortés 2014; Degryse and van Cayseele 2000; Hakenes et al. 2015). In this section, we examine whether the new regulatory regime for small BHCs is associated with any positive real effect for the local economy. To conduct our analysis, we estimate county-level regressions where the dependent variables are constructed using data on local county economic outcomes (Chen et al. 2017). The regression specification is run by using annual data and takes the following functional form:

$$\Delta\text{County Outcomes}_{c,t} = \alpha + \beta\ \text{Market Share Treated}_{\mathbf{c,t}} \times \text{Post-Shock}_{\mathbf{t}} + \gamma\ \mathbf{CC}_{c,t-1} + \mathbf{Time}_{\mathbf{t}} + \mathbf{County}_{\mathbf{c}} + \varepsilon_{c,t} \quad (5)$$

where we use two dependent variables for county outcomes. The first is the growth rate of the annual establishments at county level with less than 50 employees. The second variable is the

employment growth rate.[20] We present initially the analysis across all the sectors operating in a county and then separately for non-tradable and tradable sectors as defined by Adelino et al. (2017). Non-tradable industries depend more on local demand and as such our results are less likely to be confounded by wider changes in economic fundamentals (Adelino et al. 2017). At the same time, however, tradable industries rely more on external financing than other industries and as such they might be the primary beneficiaries of small business loans (Chen et al. 2017). The data come from the County Business Patterns program.

To understand the importance of the regulatory change in terms of county real effects, we construct a variable that measures the market share (in terms of deposits) of the commercial banks affiliated to a treated BHC at the county level (*Market Share Treated*). We then interact this variable with the post-shock dummy. The interaction term, therefore, shows whether the growth in business establishments and employment is more pronounced in the post-shock period in counties with a larger influence of treated small BHCs via their subsidiaries, as compared to the other counties. **CC** represents the vector of lagged county controls to account for differences in the macroeconomic environment across counties: % unemployment rate, % of population that are graduates, and wages per capita. Finally, we account for omitted characteristics by adding county and industry fixed effects to the models. We cluster the standard errors at the county level to control for within county correlation in economic outcomes, and account for differences in county size by using population-weighted regressions as in Chen et al. (2017).

[Insert Table 9 here]

Table 9 reports the results. We find evidence of positive real effects from the regulatory change in counties characterized by a larger market share of newly qualified small BHCs after the regulatory change. The results consistently hold for the full sample and for the subsample of

[20] We require non-missing data on each individual establishment size that forms our measure of small establishments and total employment to compute the growth rates.

tradable industries. This latter finding can be motivated by the larger potential for innovations and growth of start-up companies in tradable industries and by the larger use of external financing in these industries (Adelino et al. 2017; Chen et al. 2017).

In short, the analysis presented in this section, although characterized by the inherent difficulty to make a causal claim on the real economic effects of a regulatory change, offers some indications of the presence of benefits for the local economy from the reduced regulation on small BHCs. These findings conform to the established view that small banking firms play an important role for the development of the surrounding real economy.

## 5. Conclusion

This paper offers evidence on the effects of a decrease in capital regulation on small business lending by BHC-affiliated commercial banks using the Small Bank Holding Company Policy Statement of December 2014 that came into effect in May 2015, as a regulatory shock. This regulatory change decreased regulation on BHCs with total consolidated assets above $500 million but below $1billion that become qualified as small entities. BHCs benefitting from the small bank status are subject to a friendlier capital regulation.

Exploiting this regulatory change in a difference-in-differences setting, we document that the reduced capital regulation at the parent BHC level induces subsidiary commercial banks to increase their lending exposure towards small borrowers as compared to other commercial banks affiliated to untreated BHCs. This result holds under numerous different empirical strategies and when we employ different data on small business lending that offer the opportunity for a more refined empirical strategy that accounts for credit demand factors.

Furthermore, in line with the argument that our results are driven by the capital relief for the parent BHC, additional tests show that the increase in small business lending by treated commercial bank(s) is stronger when the parent company was more capital constrained prior to

the regulatory shock. There is some evidence of positive spillover effects from the new regulatory framework to the local economy in both the non-tradable and tradable industries.

Notably, our results do not indicate that capital regulation on small banks is not necessary. In fact, our relatively short estimation period does not allow us to draw conclusive inferences on the risk-taking implications of the new regulatory framework for the parent small BHCs and their affiliated commercial banks. Although the fact that the subsidiaries remain subject to unchanged regulatory capital requirements over our sample period might contribute to reducing the potential negative risk effects from the regulation change, our analysis is not conclusive on the net benefits arising from this change. Furthermore, our setting does not offer indications in terms of general equilibrium effects and overall level effects in the small business lending market and does exclude the possibility that some of the small business loans provided by the treated banks are substituting loans that would have been made by other traditional or shadow banks (in the absence of the regulatory change).

Overall, while it is widely argued that small banks can generate systemic threats when they are exposed to common shocks leading to joint failures, our analysis highlights the importance that the regulatory design for small banks accounts for the potential unintended consequences of an excessive regulation. Although finding the right balance between the two aspects mentioned earlier is not an easy task for regulators, our paper suggests that ignoring this issue and imposing excessive regulatory costs on small banks might significantly penalize their role in the small business lending market and result in imposing additional economic and social costs.

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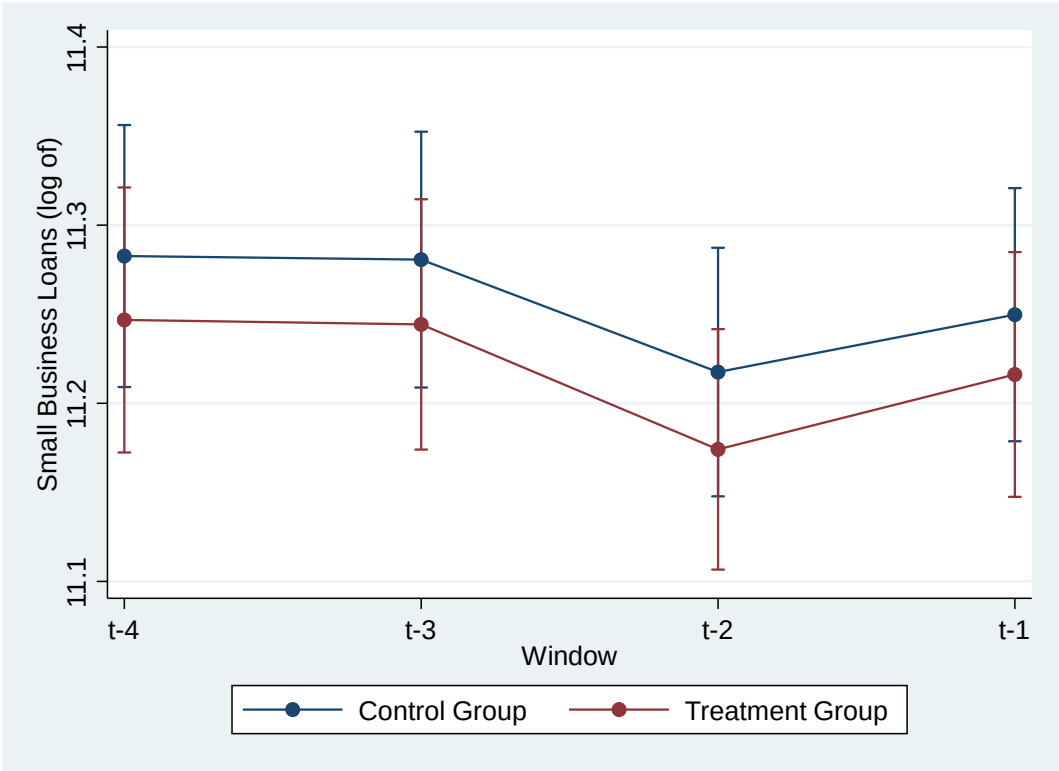


**Figure 1**: Trend in Small Business Lending over the pre-shock window. This figure reports the evolution of small business lending for the treatment and control groups from Q2-2011 to Q2-2014. We obtain our point estimates from a bank-panel regression of Small Business Loans (log of) on bank and county covariates.

**Table 1: Sample Statistics**

Panel A presents summary statistics for our sample of commercial banks from Q2 2013 to Q2 2018 for the dependent variable and from Q4 2012 to Q42017 for the explanatory variables. Panel A shows the descriptive statistics for the full sample. Panel B shows the key characteristics of banks in the control and treated groups in the last fiscal year-end before the regulatory shock (Q4 2014). The normalized difference for sample *i* and *j* for a variable x is calculated as NDIFF=$\frac{\bar{X}_i-\bar{X}_j}{\sqrt{S_i^2+S_j^2}}$. N = 234 for both control group and treated group. Small Loans ($) is the dollar amount of small loan denominations (< $ 1million), expressed in $ thousands. Bank Size is the log of total bank assets. Equity Capital is total equity scaled by assets. Deposits is bank deposits to assets. Profitability is measured as the ratio of operating income to total assets. Earnings Volatility is the standard deviation of profitability over an eight-quarter window. Loan Quality is the ratio of loan loss provisions scaled by total assets. County controls include the quarterly change in establishments, expressed in percentage, unemployment rate (in %), and weekly wage per capita. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels.

**Panel A: Descriptive Statistics**

| | **Mean** | **25th Percentile** | **Median** | **75th Percentile** | **Standard Deviation** |
|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) |
| Small Loans ($) | 107191.800 | 56106.000 | 93439.000 | 143344.000 | 71379.940 |
| Bank Size | 13.580 | 13.331 | 13.652 | 14.018 | 0.664 |
| Equity Capital | 0.106 | 0.092 | 0.103 | 0.116 | 0.022 |
| Deposits | 0.829 | 0.797 | 0.838 | 0.872 | 0.058 |
| Profitability | 0.041 | 0.036 | 0.040 | 0.046 | 0.009 |
| Earnings Volatility (x $10^2$) | 0.084 | 0.036 | 0.054 | 0.089 | 0.099 |
| Loan Quality | 0.002 | 0.000 | 0.001 | 0.002 | 0.003 |
| **Δ** Establishments | 0.004 | -0.002 | 0.003 | 0.009 | 0.009 |
| Unemployment Rate | 0.052 | 0.038 | 0.049 | 0.063 | 0.020 |
| Weekly Wage | 0.014 | 0.002 | 0.007 | 0.019 | 0.021 |

**Panel B: Control Group Differences**

| | **Control Sample** | | **Treated Sample** | | **Normalized Diff** |
|---|---|---|---|---|---|
| | Mean | Std Dev. | Mean | Std Dev. | |
| | (1) | (2) | (3) | (4) | (1)-(3) |
| Equity Capital | 0.106 | 0.020 | 0.109 | 0.024 | -0.109 |
| Deposits | 0.820 | 0.060 | 0.828 | 0.058 | -0.099 |
| Profitability | 0.041 | 0.009 | 0.041 | 0.087 | -0.018 |
| Earnings Volatility (x $10^2$) | 0.081 | 0.091 | 0.088 | 0.108 | -0.047 |
| Bank Size | 13.789 | 0.659 | 13.303 | 0.552 | **0.586** |
| Loan Quality | 0.001 | 0.001 | 0.001 | 0.003 | -0.099 |

**Table 2: The Impact of the Regulatory Change on Small Business Loans**

This table reports results from a panel regression where the dependent variable is Small Business Lending, measured as the log of the dollar amount of small loan denominations (< $1million). All independent variables are as described in Table 1. Standard errors, clustered at BHC level, are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels.

| | (1) | (2) | (3) |
|---|---|---|---|
| **Small Bank × Post-Shock** | **0.051**** | **0.051**** | **0.050**** |
| | **(0.024)** | **(0.024)** | **(0.024)** |
| Bank Size | 0.683*** | 0.683*** | 0.697*** |
| | (0.045) | (0.045) | (0.045) |
| Equity Capital | | | 1.242 |
| | | | (0.860) |
| Deposits | | | 0.453 |
| | | | (0.288) |
| Profitability | | | 3.332* |
| | | | (1.938) |
| Earnings Volatility | | | -11.867 |
| | | | (9.255) |
| Loan Quality | | | -0.799 |
| | | | (2.838) |
| Δ Establishments | | 1.123* | 1.216** |
| | | (0.598) | (0.600) |
| Unemployment Rate | | 0.562 | 0.408 |
| | | (0.965) | (0.939) |
| Weekly Wage | | -0.062 | -0.211 |
| | | (0.998) | (0.966) |
| Year FE | YES | YES | YES |
| BHC FE | YES | YES | YES |
| County FE | YES | YES | YES |
| Observations | 2,661 | 2,661 | 2,655 |
| R-squared | 0.961 | 0.961 | 0.962 |

**Table 3: The Impact of the Regulatory Change on Small Business Loans – Additional Tests**

Panel A of this table reports results from a panel regression where the dependent variable is Small Business Lending, measured as the log of the dollar amount of small loan denominations (< $1million). In columns (1) - (2) of Panel A, we estimate the Bertrand et al.'s (2004) two-period model which is based on the average of all variables over the pre- and post- shock for the treatment and control group. In the last four columns we use alternative control groups. In columns (3) – (4), the control group consists of all commercial banks affiliated to a small BHC that has consolidated assets from $400 million to $500 million. In columns (5)-(6), we use a propensity-score matched control group where the control banks are matched based on the set of bank controls shown in column (3) of Table 2. Matching is done with replacement (1:1). Panel B shows various falsification tests. Columns (1)-(2) of Panel B falsely assume that the shock increased asset threshold for banks between $1 billion and $5 billion and the control group includes all commercial banks owned by BHCs with assets above $5 billion but below $10 billion. Columns (3)-(4) conduct the test using $ 1 billion threshold but falsely assuming that the shock happened two years prior in 2013, and the sample period now ranges from 2010 to 2015. Columns (5)-(6) follow a HR3791 Senate Bill that was introduced in 2015 requiring small bank holding company asset threshold to be increased from $1 billion to $5 billion. All independent variables are as described in Table 1. Standard errors clustered at BHC level are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels.

**Panel A: Alternative specification and alternative control groups**

| | **Two-Period model following Bertrand et al. (2004)** | | **Alternative control group: SBHCs < $500 M** | | **Alternative control group: Propensity-score matching** | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **Small Bank × Post-Shock** | **0.075*** ** | **0.070** ** | **0.048** ** | **0.045*** | **0.059** ** | **0.058** ** |
| | **(0.029)** | **(0.029)** | **(0.024)** | **(0.024)** | **(0.028)** | **(0.028)** |
| County Controls | YES | YES | YES | YES | YES | YES |
| Bank Size | YES | YES | YES | YES | YES | YES |
| Other Bank Controls | NO | YES | NO | YES | NO | YES |
| Year FE | - | - | YES | YES | YES | YES |
| BHC FE | - | - | YES | YES | YES | YES |
| County FE | - | - | YES | YES | YES | YES |
| Observations | 932 | 932 | 2,506 | 2,506 | 2,057 | 2,057 |
| R-squared | 0.518 | 0.567 | 0.960 | 0.961 | 0.958 | 0.958 |

**Panel B: Falsification Tests**

| | **Pseudo Asset threshold** | | **Pseudo Time Shock** | | **Pseudo Shock: 2015 Senate Bill** | |
|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **Small Bank × Post-Shock** | 0.042 | 0.056 | 0.035 | 0.036 | 0.013 | 0.033 |
| | (0.053) | (0.049) | (0.025) | (0.025) | (0.056) | (0.051) |
| County Controls | YES | YES | YES | YES | YES | YES |
| Bank Size | YES | YES | YES | YES | YES | YES |
| Other Bank Controls | NO | YES | NO | YES | NO | YES |
| Year FE | YES | YES | YES | YES | YES | YES |
| BHC FE | YES | YES | YES | YES | YES | YES |
| County FE | YES | YES | YES | YES | YES | YES |
| Observations | 2,631 | 2,604 | 2,673 | 2,667 | 2,631 | 2,604 |
| R-squared | 0.963 | 0.964 | 0.961 | 0.962 | 0.973 | 0.974 |

**Table 4**: **The Impact of the Regulatory Change on Small Business Loans – Additional Demand Tests**

This table reports results from a panel regression where the dependent variable is Small Business Lending, measured as the log of the dollar amount of small loan denominations (< $1million). Columns (1) and (2) only consider banks that operate in contiguous counties located near the treated bank's county, columns (3) and (4) control for State-Year fixed effects. Standard errors, clustered at BHC level, are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels.

| | **Same and Contiguous Counties** | | **State-Year FE** | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| **Small Bank × Post-Shock** | **0.073**** | **0.072**** | **0.053**** | **0.053**** |
| | **(0.029)** | **(0.029)** | **(0.025)** | **(0.025)** |
| County Controls | YES | YES | YES | YES |
| Bank Size | YES | YES | YES | YES |
| Other Bank Controls | NO | YES | NO | YES |
| Time FE | YES | YES | YES | YES |
| BHC FE | YES | YES | YES | YES |
| County FE | YES | YES | NO | NO |
| State - Year FE | NO | NO | YES | YES |
| Observations | 2,063 | 2,063 | 2,655 | 2,655 |
| R-squared | 0.945 | 0.956 | 0.934 | 0.935 |

**Table 5: The Impact of the Regulatory Change on Small Business Loan Originations - Evidence from the SBA 7A Program**

This table presents the results on the impact of the SBHC regulatory change on the origination of loans under the Small Business Administration's (SBA) 7A program. Panel A shows the descriptive statistics for the SBA 7a loans in the form of Preferred Lender Program and SBA Express. Panel B shows the multivariate results. The dependent variable is the dollar amount of SBA loans originated. *Loan Maturity* is the number of months to maturity. *Interest* is total interest rate at origination in excess of maturity-matched T-bill rate. *Guarantee* is fraction of gross loans guaranteed by the SBA. *Revolver Status* is a dummy variable that equals one if the loan had a revolving facility. Borrower industry is based on 2-digit NAICS code. The remaining independent variables are as described in Table 1. Standard errors, clustered at BHC level, are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels.

| **Panel A: Descriptive Statistics** | | | | | |
|---|---|---|---|---|---|
| | **Mean** | **25th percentile** | **Median** | **75th percentile** | **SD** |
| Gross Loans | 477139.600 | 100000.000 | 225000.000 | 225000.000 | 618550.900 |
| Loan Interest | 3.295 | 2.603 | 3.431 | 3.862 | 1.047 |
| Loan Maturity (years) | 11.155 | 7 | 10 | 10 | 6.658 |
| Guarantee | 0.690 | 0.5 | 0.75 | 0.75 | 0.132 |
| Revolver Status | 0.170 | 0 | 0 | 0 | 0.366 |

| **Panel B: Multivariate Analyses** | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| **Small Banks × Post-Shock** | **0.199**** | **0.167**** | **0.143**** | **0.194***** |
| | **(0.085)** | **(0.074)** | **(0.065)** | **(0.061)** |
| Loan Interest | -0.588*** | -0.583*** | -0.674*** | -0.668*** |
| | (0.101) | (0.099) | (0.069) | (0.068) |
| Loan Maturity | 0.067*** | 0.067*** | 0.066*** | 0.065*** |
| | (0.004) | (0.005) | (0.005) | (0.005) |
| Guarantee | -0.250 | -0.229 | -0.309 | -0.196 |
| | (0.888) | (0.880) | (0.913) | (0.853) |
| Revolver Status | -0.430*** | -0.430*** | -0.425*** | -0.412*** |
| | (0.128) | (0.128) | (0.128) | (0.115) |
| County Controls | YES | YES | YES | YES |
| Bank Size | YES | YES | YES | YES |
| Other Bank Controls | NO | YES | YES | YES |
| Time FE | YES | YES | YES | YES |
| BHC FE | YES | YES | YES | YES |
| Industry × County FE | YES | YES | - | - |
| Industry × State FE | - | - | YES | - |
| Industry × State × Borrower Size Tercile FE | - | - | - | YES |
| Observations | 11,935 | 11,779 | 11,779 | 11,779 |
| R-squared | 0.762 | 0.763 | 0.661 | 0.618 |

**Table 6: Is the Increase in Small Business Loans Driven by a Capital Channel?**

Panels A and B of this table show the results for the heterogeneity in the treatment effects induced by the capital strength of the treated BHC pre-regulatory shock. In Panel A, commercial banks are classified in the [Low Pre-shock Capital = 1] subgroup if the regulatory capital measure in Q4-2014 of the parent BHC is below the median and [Low Pre-shock Capital = 0] if the capital measure in Q4-2014 is above the median. Tier-1 regulatory capital is the ratio of Tier-1 regulatory capital scaled by total assets at the BHC level. In Panel B, commercial banks in the treated group are classified in the [High Pre-shock Leverage = 0] subgroup if the leverage measure in Q4-2014 is below the median and [High Pre-shock Leverage = 1] if the leverage measure in Q4-2014 is above the median. Leverage is measured using double leverage which is calculated as the total equity investment by the parent holding company scaled by the parent company's equity capital. In Panel C the dependent variable is the equity capital infusion that the subsidiary commercial bank received from its holding company. It is measured as the change in capital stock and other business combinations divided by the beginning-of-year equity capital of the parent company multiplied by the BHC's ownership stake. SBA loan controls include loan interest, loan maturity and % SBA guarantee. The remaining independent variables are as described in Table 1. Standard errors, clustered at BHC level, are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels.

**Panel A: Tier-1 Regulatory Capital**

| | **Small Business Loans** | | **SBA Loans** | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| **[Low Pre-shock Capital = 1] Small Banks × Post-Shock** | **0.074**** | **0.073**** | **0.181**** | **0.153**** |
| | **(0.037)** | **(0.042)** | **(0.074)** | **(0.070)** |
| **[Low Pre-shock Capital = 0] Small Banks × Post-Shock** | 0.018 | 0.021 | 0.084 | 0.055 |
| | (0.491) | (0.413) | (0.079) | (0.074) |
| County Controls | YES | YES | YES | YES |
| Bank Size | YES | YES | YES | YES |
| Other Bank Controls | NO | YES | NO | YES |
| SBA Loan Controls | NO | NO | YES | YES |
| Industry × County FE | NO | NO | YES | YES |
| Time FE | YES | YES | YES | YES |
| BHC FE | YES | YES | YES | YES |
| County FE | YES | YES | - | - |
| Observations | 2,590 | 2,590 | 10,830 | 10,830 |
| R-squared | 0.962 | 0.962 | 0.763 | 0.764 |

**Panel B: Double Leverage**

| | **Small Business Loans** | | **SBA Loans** | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| **[High Pre-shock Leverage = 1] Small Banks × Post-Shock** | **0.058*** | **0.056*** | **0.261**** | **0.234*** |
| | **(0.033)** | **(0.032)** | **(0.132)** | **(0.126)** |
| **[High Pre-shock Leverage = 0] Small Banks × Post-Shock** | 0.038 | 0.041 | **0.133*** | 0.115 |
| | (0.028) | (0.028) | **(0.078)** | (0.072) |
| County Controls | YES | YES | YES | YES |
| Bank Size | YES | YES | YES | YES |
| Other Bank Controls | NO | YES | NO | YES |
| SBA Loan Controls | NO | NO | YES | YES |
| Industry × County FE | YES | YES | YES | YES |
| Time FE | YES | YES | YES | YES |
| BHC FE | YES | YES | YES | YES |
| County FE | YES | YES | YES | YES |
| Observations | 2,652 | 2,652 | 11,221 | 11,221 |
| R-squared | 0.962 | 0.962 | 0.761 | 0.761 |

**Panel C: Equity Infusion**

| | (1) | (2) |
|---|---|---|
| **Small Banks × Post-Shock** | **0.074**** | **0.073**** |
| | **(0.037)** | **(0.042)** |
| County Controls | YES | YES |
| Bank Size | YES | YES |
| Other Bank Controls | NO | YES |
| Time FE | YES | YES |
| BHC FE | YES | YES |
| County FE | YES | YES |
| Observations | 2,590 | 2,590 |
| R-squared | 0.962 | 0.962 |

**Table 7: Does the Regulatory Change Affect Other Lending Arrangements?**

The table shows the results of the effect of the regulatory change in the definition of small BHC on other lending arrangements. In columns (1) and (2) the dependent variable is the log of the dollar value of bank mortgages, in columns (3) and (4) the dependent variable is the log of the dollar value of commercial and industrial loans, and in columns (5) and (6) the dependent variable is the log of the dollar value of other loans (computed as total loans minus C&I and Real Estate loans). In columns (7) and (8) ((9) and (10) the dependent variable is measured as the log of the dollar value of total (unused) loan commitments. Total commitments consist of unused loan commitments and letters of credit (financial, performance, and commercial). All independent variables are as described in Table 1. Standard errors, clustered at BHC level, are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels.

| | **Mortgage** | | **C&I Loans** | | **Other Loans** | | **Total Loan Commitments** | | **Unused Loan Commitments** | |
|---|---|---|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5 | (6) | (7) | (8) | (9) | (10) |
| **Small Banks × Post-Shock** | 0.018 | 0.016 | 0.037 | 0.045 | -0.031 | -0.034 | **0.097**** | **0.095**** | **0.097**** | **0.096**** |
| | (0.029) | (0.026) | (0.050) | (0.050) | (0.036) | (0.034) | **(0.045)** | **(0.040)** | **(0.047)** | **(0.042)** |
| County Controls | NO | YES | NO | YES | NO | YES | NO | YES | NO | YES |
| Bank Size | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Other Bank Controls | YES | YES | YES | YES | YES | YES | NO | YES | NO | YES |
| Time FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| BHC FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| County FE | YES | YES | YES | YES | YES | YES | YES | YES | YES | YES |
| Observations | 2,620 | 2,620 | 2,613 | 2,613 | 2,240 | 2,240 | 2,653 | 2,648 | 2,653 | 2,648 |
| R-squared | 0.969 | 0.969 | 0.931 | 0.932 | 0.948 | 0.949 | 0.908 | 0.911 | 0.899 | 0.902 |

**Table 8: Does the Regulatory Change Increase Credit Risk-Taking?**

The table shows the results on the impact of the regulatory change in the definition of small BHC on the credit-risk taking of the affiliated commercial banks. In columns (1) and (2), SBA Loan Spread is calculated as the log of interest charged on SBA loans in excess of maturity-matched T-bill rate. Columns (3) and (4) use a similar measure based on call report data where we calculate the log of net interest margin (net interest income by operating assets) in excess of five-year T-bill rate. SBA loan controls include loan interest, loan maturity and % SBA guarantee. The remaining independent variables are as described in Table 1. Standard errors, clustered at BHC level, are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels.

| | **SBA Loan Spread** | | **Lending Spread** | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| **Small Banks × Post-Shock** | 0.058 | **0.070**** | **0.065**** | **0.065**** |
| | (0.041) | **(0.033)** | **(0.027)** | **(0.027)** |
| County Controls | YES | YES | YES | YES |
| Bank Size | YES | YES | YES | YES |
| Other Bank Controls | NO | YES | NO | YES |
| SBA Loan Controls | YES | YES | NO | NO |
| Time FE | YES | YES | YES | YES |
| BHC FE | YES | YES | YES | YES |
| County FE | YES | YES | YES | YES |
| Industry * County FE | YES | YES | NO | NO |
| Observations | 11,779 | 11,779 | 2,588 | 2,588 |
| R-squared | 0.718 | 0.720 | 0.799 | 0.802 |

**Table 9: Regulatory Change, Small Banks and Real Economic Outcomes**

The table shows the results on the impact of the regulatory change in the definition of small BHCs on county outcomes. The dependent variable in columns (1)-(3) is the change in small establishments (defined as all establishments that employ less than 50 employees) and in columns (4)-(6) is the change in employment. Market Share Treated measures the market share (in terms of deposits) of the treated BHCs at the county level. Non-tradable industries are defined as industries that fall in the two-digit NAICS codes 44-45 (Retail Trade) and 72 (Accommodation and Food Services), following Adelino et al. (2017). We obtain county-specific data from the County Business Patterns dataset from 2013-2018. Estimated coefficients are weighted by county population as of the beginning of 2012. All independent variables are as described in Table 1. Standard errors, clustered at county level, are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels.

| | **Δ Small Establishments (%)** | | | **Δ Employment (%)** | | |
|---|---|---|---|---|---|---|
| | Full Sample | Tradable | Non-Tradable | Full Sample | Tradable | Non-Tradable |
| | (1) | (2) | (3) | (4) | (5) | (6) |
| **Market Share Treated × Post-Shock** | **0.017*** ** | **0.018** ** | **0.015*** ** | **0.092*** ** | **0.106*** ** | 0.014 |
| | **(0.006)** | **(0.008)** | **(0.006)** | **(0.021)** | **(0.024)** | (0.013) |
| County Controls | YES | YES | YES | YES | YES | YES |
| Time FE | YES | YES | YES | YES | YES | YES |
| County X Industry FE | YES | YES | YES | YES | YES | YES |
| Observations | 91,926 | 75,129 | 16,797 | 136,564 | 118,213 | 18,351 |
| R-squared | 0.007 | 0.006 | 0.021 | 0.004 | 0.004 | 0.012 |

# Online Appendix

## Small Business Lending and Regulation for Small Banks

Abhishek Srivastav
*University of Edinburgh, U.K.*

Francesco Vallascas
*University of Durham, U.K.*

**A1: Common Trends between Treated and Control Group**

**A2: Impact of Shock on Bank Lending Policy – Alternative Dependent Variable**

**A3: Impact of the Regulatory Change on Bank Lending Policy – Additional Controls**

**A4: Small Banks and Lending above $1 million**

**A5: Small BHCs and Debt**

**Table A1: Common Trends between Treated and Control Group**

This table shows the trend differential in bank Small Business Lending in the pre-event and post-event window. The dependent variable is the log of the dollar amount of small loan denominations (< $1million). All independent variables are as described in Table 1. Dummy variable $D_{jt}^{q}$ corresponds to the q lags/leads of the time period around the passage of the Small Bank Holding Company Policy Statement. We use base period Q2 2015, namely, when the regulatory change was enacted. The number of observations in this table exceeds our final sample because the regression is run using small lending data from Q2 2011 to Q2 2018 to employ a longer pre-event period. Standard errors are clustered by BHC and reported in parenthesis. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels.

| | **(1)** |
|---|---|
| Small Bank * $D_{jt}^{-4}$ | 0.057 |
| | (0.056) |
| Small Bank * $D_{jt}^{-3}$ | 0.017 |
| | (0.030) |
| Small Bank * $D_{jt}^{-2}$ | -0.019 |
| | (0.025) |
| Small Bank * $D_{jt}^{-1}$ | -0.012 |
| | (0.020) |
| Small Bank * $D_{jt}^{+1}$ | 0.018 |
| | (0.017) |
| Small Bank * $D_{jt}^{+2}$ | 0.062** |
| | (0.025) |
| Small Bank * $D_{jt}^{+3}$ | 0.064** |
| | (0.031) |
| Year, BHC, and County FE | YES |
| Observations | 3,485 |
| R-squared | 0.946 |

**Table A2: Impact of Shock on Bank Lending Policy – Alternative Dependent Variable**

This table reports the results when we the dependent variable is the relative importance of Small Business Lending at the commercial bank level that we measure as the dollar amount of small loan denominations (< $1million) scaled by total assets. Columns (1) and (2) replicate our baseline panel regressions, whereas Columns (3) and (4) repeat the analysis following the two-period model of Bertrand et al. (2004). All independent variables are as described in Table 1. Standard errors clustered at BHC level are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels.

| | **Panel Setting** | | **Two-Period model following Bertrand et al. (2004)** | |
|---|---|---|---|---|
| | (1) | (2) | (3) | (4) |
| **Small Bank × Post-Shock** | **0.006*** ** | **0.005** ** | **0.080*** ** | **0.076*** ** |
| | **(0.002)** | **(0.002)** | **(0.028)** | **(0.028)** |
| Other Controls | NO | YES | NO | YES |
| Time FE | YES | YES | YES | YES |
| BHC FE | YES | YES | YES | YES |
| County FE | YES | YES | YES | YES |
| Observations | 2,675 | 2,669 | 932 | 932 |
| R-squared | 0.915 | 0.918 | 0.519 | 0.569 |

**Table A3: Impact of the Regulatory Change on Bank Lending Policy – Additional Controls**

This table reports the results of our baseline model in Table 2 with the inclusion of various additional county and bank controls. The dependent variable is Small business lending, measured as the log of the dollar amount of small loan denominations (< $1million). Columns (1) and (2) account for various demographic controls that include the fraction of population that is over 25 years, and the fraction of population that is college graduates. Columns (3) and (4) control for contiguous county-year fixed effects to control for time-varying effect across control banks located in the same/neighboring county as the treated banks, where County-Year FE are excluded if we have less than two observations per county-year cohort in the sample. Demographic data is obtained from American Community Survey. County growth variables are the one-year growth in county population, wages and labor force. Bank controls include the HHI based on deposit market share that is weighted by the fraction of bank deposits in each county, and the sensitivity to market risk which is measured as the absolute difference between short-term assets and liabilities scaled by assets. The remaining independent variables are as described in Table 1. Standard errors, clustered at BHC level, are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels.

| | (1) | (2) | (3) | (4) |
|---|---|---|---|---|
| **Small Bank × Post-Shock** | **0.050**** | **0.051**** | **0.050**** | **0.051**** |
| | **(0.024)** | **(0.023)** | **(0.024)** | **(0.024)** |
| Population Age = 25+ | 0.880 | | | |
| | (1.190) | | | |
| Population Graduates | 0.005 | | | |
| | (0.007) | | | |
| 1-yr Population Growth | 0.310 | | | |
| | (0.831) | | | |
| 1-yr Labor Growth | 0.185 | | | |
| | (0.303) | | | |
| 1-yr Wages Growth | 0.142 | | | |
| | (0.125) | | | |
| HHI Deposits | | -0.138 | | |
| | | (0.300) | | |
| Sensitivity to Market Risk | | 0.212 | | |
| | | (0.425) | | |
| Other Controls | YES | YES | NO | YES |
| Time FE | YES | YES | YES | YES |
| BHC FE | YES | YES | YES | YES |
| County FE | YES | YES | - | - |
| Contiguous County X Year FE | NO | NO | YES | YES |
| Observations | 2,655 | 2,655 | 2,655 | 2,655 |
| R-squared | 0.962 | 0.962 | 0.932 | 0.932 |

**Table A4: Small Banks and Loans Different From Small Business Lending**

The table shows the results for the effect of the regulatory change in the definition of small BHC on loans different from small business loans. The dependent variable is measured as the log of the dollar value of total loans minus all small business loans (less than $1 million). All independent variables are as described in Table 1. Standard errors clustered at BHC level are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels.

| | (1) | (2) |
|---|---|---|
| **Small Banks × Post-Shock** | 0.007 | 0.003 |
| | (0.022) | (0.018) |
| County Controls | NO | YES |
| Bank Size | YES | YES |
| Other Bank Controls | YES | YES |
| Time FE | YES | YES |
| BHC FE | YES | YES |
| County FE | YES | YES |
| Observations | 2,655 | 2,655 |
| R-squared | 0.986 | 0.987 |

**Table A5: Small BHCs and Debt**

The table shows the results of the effect of the regulatory change in the definition of small BHC on the HC debt. The dependent variable is measured as the log of short-term and long-term borrowings using data on FR Y9LP and FR Y9SP reports that contain unconsolidated accounting information at the parent company level. The regression is run at the HC-level and control variables consist of HC Size, defined as log of assets, Profitability defined as total operating income to assets, and Equity calculated as HC equity to assets. Standard errors clustered at BHC level are in parentheses. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels.

| | (1) | (2) |
|---|---|---|
| **Small Banks × Post-Shock** | **0.649*** | **0.723**** |
| | **(0.338)** | **(0.314)** |
| Bank Size | YES | YES |
| Other Bank Controls | NO | YES |
| Time FE | YES | YES |
| BHC FE | YES | YES |
| Observations | 2,366 | 2,365 |
| R-squared | 0.674 | 0.693 |